TORONTO TRANSPORTATION ISSUES

A report on some factors affecting
the planning of transportation facilities
with implications for the expenditure of public funds.

prepared by

Marathon Realty Company Limited

as part of the public discussion
on the Toronto railway lands.

June 25, 1985

Marathon Realty Company Limited
40 University Avenue, Suite 300
Toronto, Ontario M5J 2K3
(416) 977 1400

SUMMARY:

Contrary to common perceptions, there has been a very limited growth of travel into the central core of Toronto at rush hour. There is no reason to assume there will be a major increase in the future.

There appears to be a general perception that travel into the core of Toronto has increased greatly over the years. In fact, when viewed over 30 years (see figure 2), there has been a sustained annual growth rate of only about 1% of rush-hour commuters into the downtown area. Practically all of this growth in recent years has been on the GO trains, with other transit and auto ridership being virtually unchanged over the period. Certainly there are fluctuations in the yearly commuter counts, and these fluctuations have been used to promote major transportation proposals. But the general trend is one of very limited increase.

Individual travellers frequently suffer aggravation at rush hour at particular bottlenecks, and this makes them ready to believe that the situation is getting worse and worse, but the travel facts are to the contrary.

Sound transportation planning, for what are very costly facilities, requires realistic estimates of future transportation demand. Various factors contribute to this demand, one of the most important being the employment in the destination area. This has been calculated in several ways, a commonly used method being to project new office floor space and assume that employment changes proportionately.

However, each worker now occupies about $1\frac{1}{2}$ times as much space as he or she might have 20 years ago and the ratio is still increasing. It is important to recognize that this increase in area per worker applies to exising buildings as well as to new buildings. Clearly, floor space is not a direct measure of employment, let alone of rush-hour travel.

Another method that has been used to predict employment is to project population and then work out a proportion that seems likely to work downtown. This has produced suggestions of strong growth. But, in fact, downtown employment will only be what is generated by downtown businesses and there is no evidence to suggest a rapid growth in demand. The economy of the next decade or two does not seem likely to boom in the same way as the 1960's and 70's did.

The simple fact is that downtown rush-hour travel has gone up by only about 25% since 1962, while office space is now more than $2\frac{1}{2}$ times what it was then.

Analysts and the proponents of major projects are overestimating future travel levels and thereby the capacities required on transportation facilities.

Billions of dollars of public transit proposals to serve the core are based on questionable employment and travel projections. The present systems mostly have adequate capacity. Some proposed facilities are not likely to be required and these propositions should be carefully reviewed. Any public money available should be used in the most overall cost-effective manner.

Presently, the transit facilites serving the core of Toronto have enough capacity to meet demand. The one service that is nearing capacity and needs to be expanded is the GO train service, particulary along the Lakeshore line.

This reflects what is happening in the Toronto region. The population of Metro Toronto is now quite static and the work-trips from Metro into the core are fairly stable. The population beyond Metro is expanding and the trips from that part of the region into downtown are growing.

Plans are now being worked out for the expansion of the GO Lakeshore line, and possibly the inauguration of improved services on other rail lines. These meet evident regional needs. On the other hand, the so-called Relief Line, which is intended to relieve pressure on the Yonge subway line south of Bloor, is not required for more than ten years even by the proponents' estimates, and the situation suggests that it may never be needed. The static population within Metro, which is the primary market area for the subway system, will probably yield a constant or even a declining number of rush-hour riders to the core over the years ahead.

There is a huge amount of public funds involved. Clearly, there are severe limits on the funds available and money should not be spent on unnecessary projects. Otherwise, areas such as other transportation needs, public housing, education, day care, social services, environmental protection, etc. will go short.

The Province provides most of the capital funds for transportation, but it is all public money and should be used to the greatest possible public advantage.

RECOMMENDATIONS:

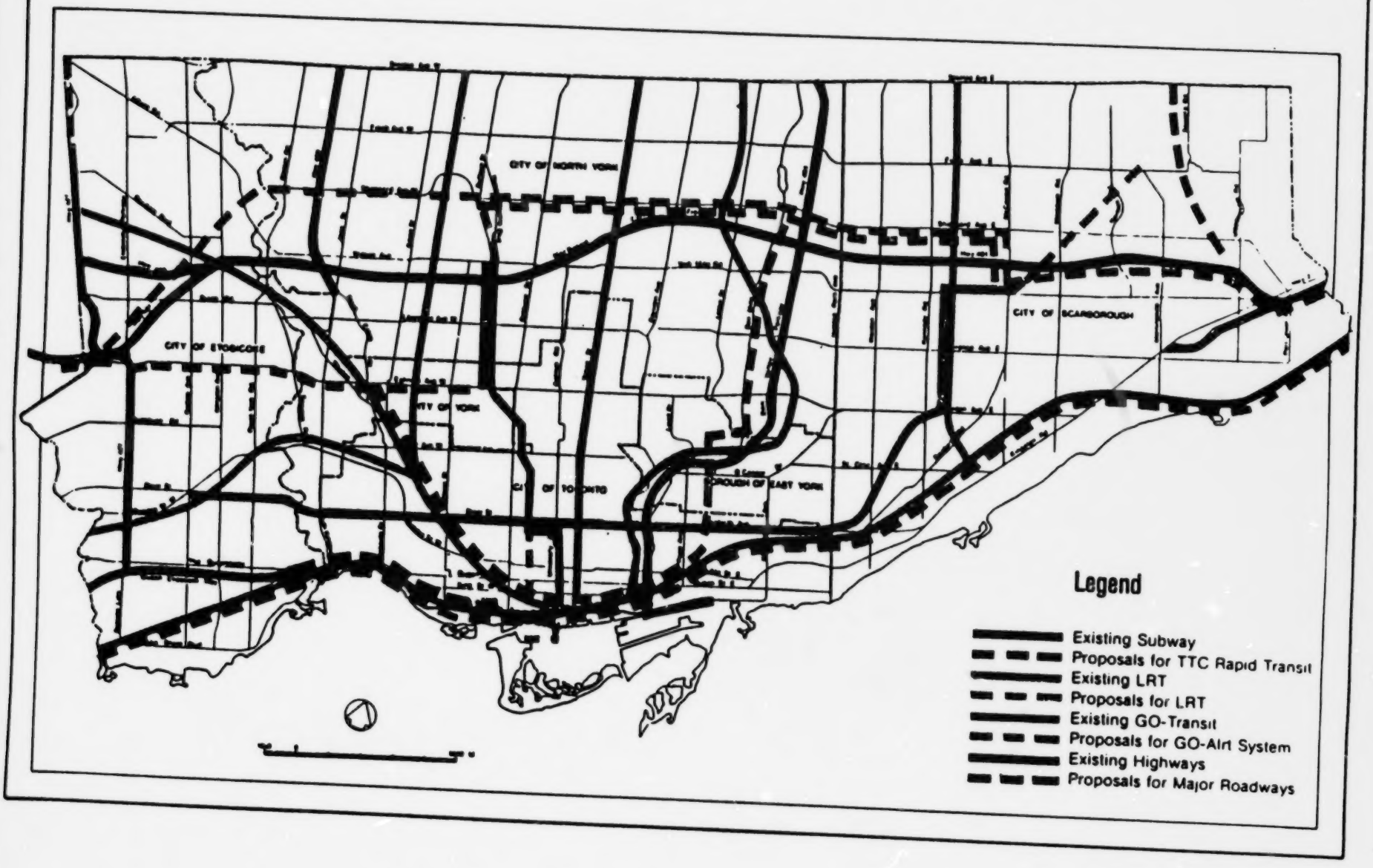
Current assumptions about increases in travel into the central core, and the transportation plans based upon them, should be carefully examined by the various government agencies and elected officials involved. The plans may be useful as a long-term contingency preparation in case the various proposals were ever required. But the situation should be monitored carefully and commitments to projects should only be made where the need is now very clear. Otherwise, Metro and the Province risk ending up with facilities that, like the Pickering or the Mirabel airports, involve great public expenditure in response to overestimated demands.

At this time there is a need to improve the GO Transit commuter rail service, and this need will increase as the region around Toronto expands. Some regional road expansion may also be necessary.

It also seems that not enough emphasis has been given to relatively inexpensive ways of maximizing the use of existing facilities and improving levels of service. Major enhancements in transportation comfort and service levels are certainly attractive, but society must ask if it is prepared to spend such large sums on questionable major transit projects or if the available public financial resources would be better spent on other social priorities and less expensive transportation improvements.

FIGURE 1

Major Transportation Proposals



Why Marathon Is Issuing This Report

The development of the Toronto railway lands will have significant implications for the Toronto region. It will remove many of the physical and psychological impediments which have kept the city from the full enjoyment of its waterfront and create a fine new asset. The development itself will offer business the space required for the normal evolution of commerce and the people of Toronto an attractive service centre. There are also major transportation implications.

Marathon Realty Company Limited, one of the developers of the railway lands, realizes that there are many aspects of a project of this size. We realize that we have a responsibility to examine every aspect in terms of its impact on Toronto. To do so, we have engaged experienced consultants to examine the larger picture.

Dan Cherepacha, vice-president of Read, Voorhees & Assoc. Ltd., has been a consultant on the transportation aspects of the railway lands project for 4 years, and has been a transportation consultant in Toronto for 20 years. Having studied transportation demands in the greater Toronto area for many years, he has insight into the methods and assumptions used. The contents of this report are based on the results of his work.

The data used in the analyses were collected by the Toronto Transit Commission, the regional government of Metropoliton Toronto, the City of Toronto, the Province of Ontario and the Statistics Canada Census. In short, the study was a close look at the facts and their implications for transportation planning.

Marathon is concerned that the central area and our project have adequate and appropriate transportation services and that public expenditures on the matter be reasonable. But examination of the data made it apparent that several current transportation proposals are based on assumptions which are questionable. Since these affect not only the future of Toronto, but also the ability to make expenditures on other social needs, the data and the questions they raise should be discussed in public.

As a result of our studies, we have reached the conclusion that no major new transportation facilities would be required to serve our projects. Marathon does not issue this conclusion lightly, because, if we are wrong, the lack of good transportation would jeopardize the economic viability of our development.

The Cost of Toronto Transportation Proposals

Based on predictions of the future volume of commuters, various proponents have put forward over 8 billion dollars of transportation proposals for the metropolitan Toronto region.

Figure 1 shows the location of the major projects which are summarized here:

	million $s
Subway Relief Line to relieve Yonge Subway crowding	565
Extension of this Relief Line from Danforth to North	700
Extension of this Relief Line from Union Station to Northwest	800
Eglinton West Subway	820
Sheppard Subway	1,240
Northern GO-ALRT	2,700
Lakeshore GO-ALRT	1,250
Gardiner Widening	85
TOTAL	8,160

While these are the estimates of the costs of these projects published by the proponents, it should be noted that there are other factors which would make these costs much higher than $8 billion:

1. These prices do not include land costs.
2. Some of these estimates are already a year or two out of date and have not been adjusted for inflation.
3. Historically, such estimates have tended to be low, sometimes at only 50% of the actual cost. For example, the new Scarborough line was originally estimated at $100 million and actually ended up costing $200 million.

Some of these proposals would overlap. For example, the TTC's Eglinton and Sheppard subway lines together would serve part of the same function as the province's Northern GO-ALRT line. It seems that the Province has put off the GO-ALRT implementation for the time being, and the TTC has put forward a $2.8 billion plan for the expansion of the metro rapid transit system.

The proponents may argue that only first phases of some of these proposals need be built, thereby reducing costs. But short segments of transit facilities often do not generate enough use to justify their existence. The subway Relief Line might not be justified on its own, creating pressure for the two extensions. Therefore, the three costs should be considered in tandem, making the project ultimately at least $2 billion.

Misconceptions About Toronto Transportation Needs

With the expenditure of so much public money resting on questionable predictions about future transportation needs, it is essential to examine the perceptions which could lead to support for these proposals.

Misconception: Peak-hour travel into the core of Toronto is thought to have increased greatly over the years, especially during periods of rapid growth and development.

Fact: When viewed over 30 years, there has been a sustained growth rate of about 1%, i.e. about 1,000 more commuters at rush hour per year, headed for the downtown area.

For years, the TTC and other agencies have been counting the number of commuters and vehicles crossing certain cordons to get to work. Over time, trends can be noted and a rate of growth in commuting can be defined. TTC travel data for two of the cordons is plotted in figures 2 and 3. Figure 2 is for the Downtown cordon, which contains the financial district and its surroundings, while figure 3 takes in the whole central area, from the waterfront to north of Bloor Street.

Downtown data shows little change except for the increase in GO riders. At the same time, the larger Central Area shows a gradual increase in transit passengers, but little or no change in automobile riders. The rush-hour auto traffic into the Core has remained remarkably stable over many years.

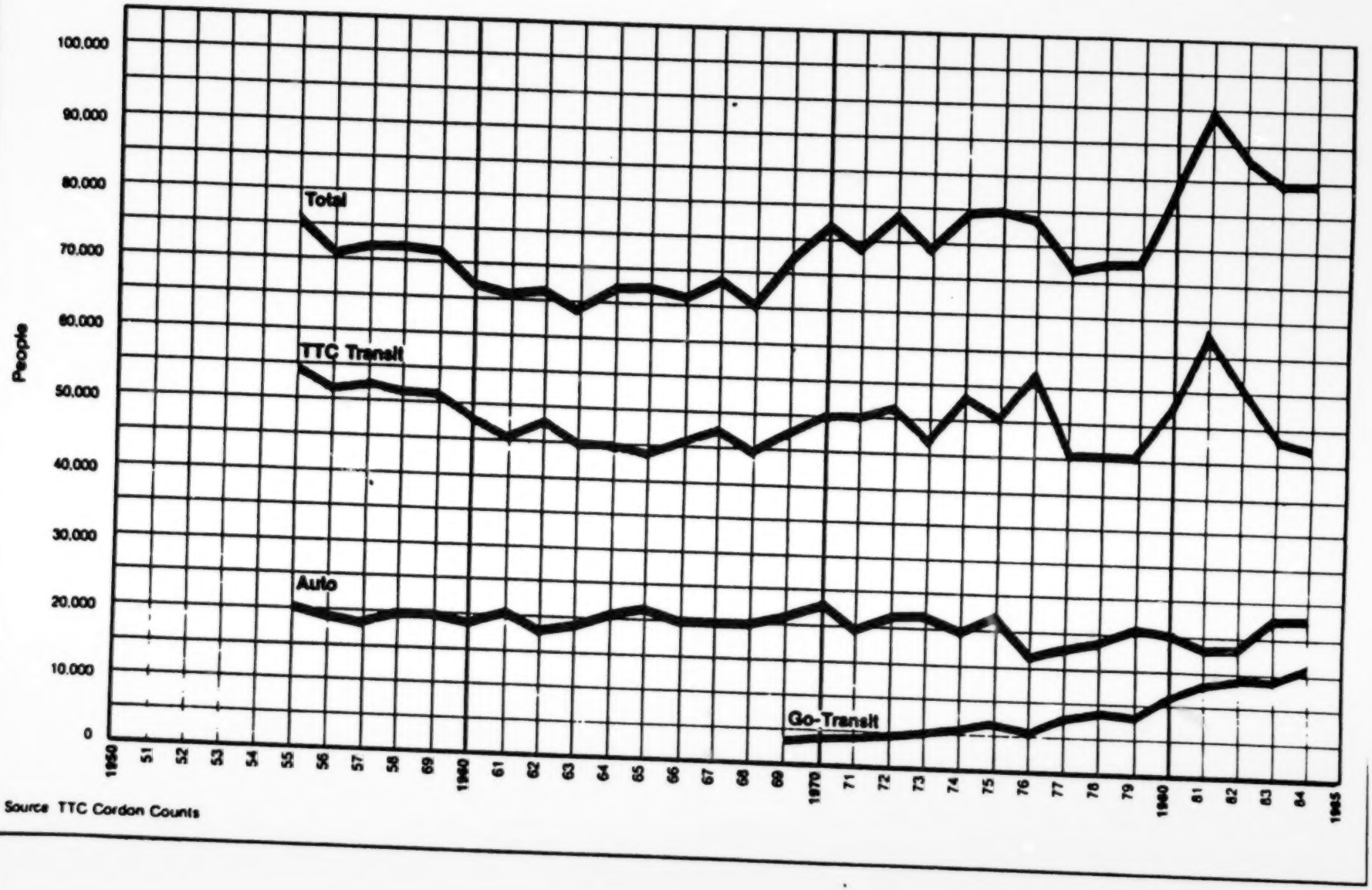
Cordon counts for any one year are subject to fluctuations due to abnormal conditions or even the counting technique itself. Such fluctuations can skew perceptions if only the short time span is projected forward. However, over the long run, such peaks or valleys tend to average out.

Perhaps it is useful to note an example of the effect of using a short time span to support a recommendation. The span involved was 1979 to 1981 when there was a sharp rise in the TTC transit count across the downtown cordon (see figure 2, TTC transit, 1979 to 1981 period).

The planning document which used this abnormal rise is the May, 1982, Summary Report of the Metro/TTC Rapid Transit Study, which recommended and rationalized the Relief subway line. Appendix I of that report gave the alarming ridership trends in a table quoted as follows:

FIGURE

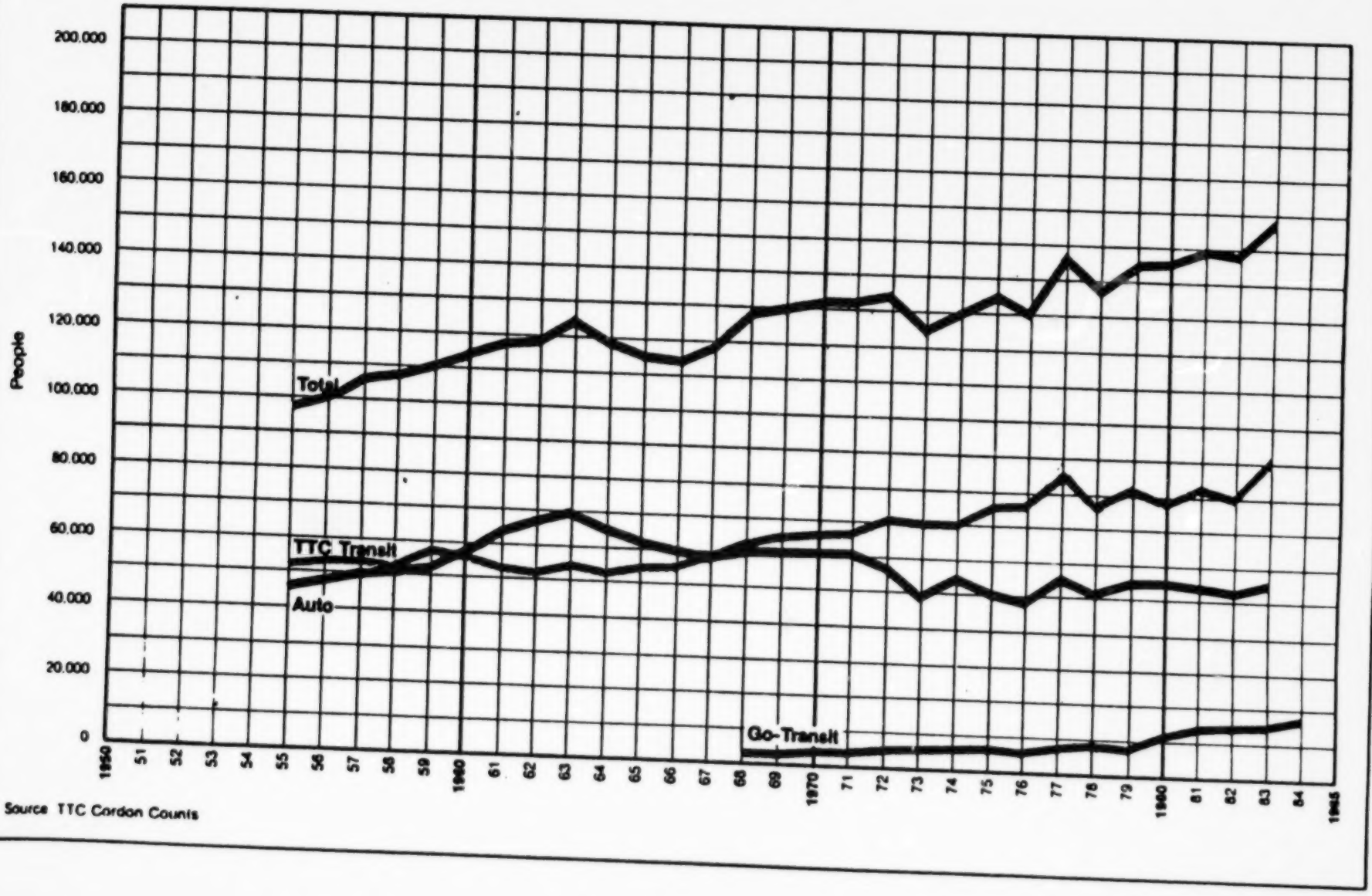
People Entering Downtown in Morning Peak Hour



Source TTC Cordon Counts

FIGURE 3

People Entering Central Area (Intermediate Cordon) In Morning Peak Hour



Source TTC Cordon Counts

AM Peak Hour Increase Location/Direction	1979-1981
Rosedale-Bloor / southbound	+13.9%
Bloor-Wellesley / southbound	+18.6%
Sherbourne-Younge / westbound	+18.9%
Dupont-Spadina / southbound	+19.5%
St. George-Museum / southbound	+14.2%
Spadina-St. George / eastbound	+16.7%

Increases of almost 20% over two years would certainly be seen as a call for action by the decision makers presented with this summary.

As a result of the joint Metro/TTC submission, the TTC was authorized in May 1982, to carry out studies for a subway to run from the Danforth line, in the vicinity of the Greenwood yards, down to Union Station.

However, as figure 2 shows, the TTC has had a subsequent decreasing ridership since 1981 and is now back to 1979 levels and these were the same as 1960. The three-year 20% growth trend that was used to justify the concept of a relief subway line must be viewed as only a short term variation at that cordon. There has since been a three year 20% decline in the TTC ridership at the downtown cordon.

Figure 3 shows intermediate cordon data similar to the figure 2 graph of the downtown cordon. It shows that there was no 1981 rise at the intermediate cordon parallel to the downtown cordon rise in figure 2. Thus, the extra 10,000 people that account for the steep rise in the downtown cordon would have had to board the subway inside the intermediate cordon, if the survey data were correct.

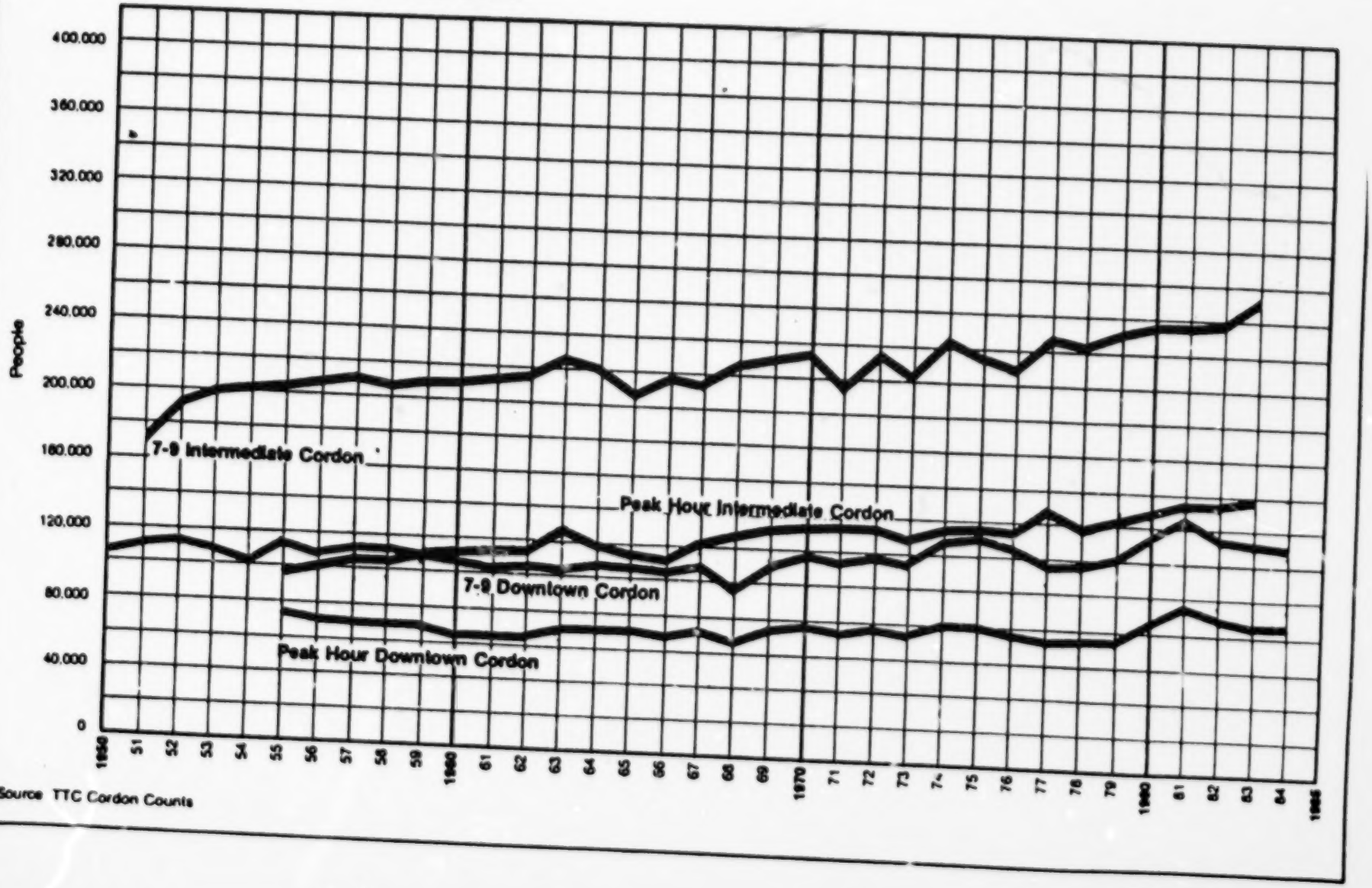
The data in both figures 2 and 3 shows the total commuter growth rate to be about 1% per year since the mid 60s, thus confirming each other.

Both these figures describe peak-hour loads which are significant because they provide an indication of the maximum load a transit system must carry. However, data for the two-hour peak period gives a better indication of the growth in the total number of commuters. While workers now have more flexibility in arrival times and can shift their trip outside of the peak hours, there has been a rather constant relationship between the peak-hour and the peak-two-hour periods. Figure 4 demonstrates that the overall increase in the number of commuters heading toward the centre of Toronto approximately reflects the same steady rate of increase for the peak hour.

All the data used in these graphs has been from counts made by the TTC. These trends are confirmed, as shown in figure 5, by independent counts done by Metro Toronto and City of Toronto for the biennial Metro Cordon Count Program. While the cordons are not exactly the same and the time frame of the Metro data is not long enough to reliably indicate trends longer than 8 years, they generally confirm the TTC data for that period.

FIGURE 4

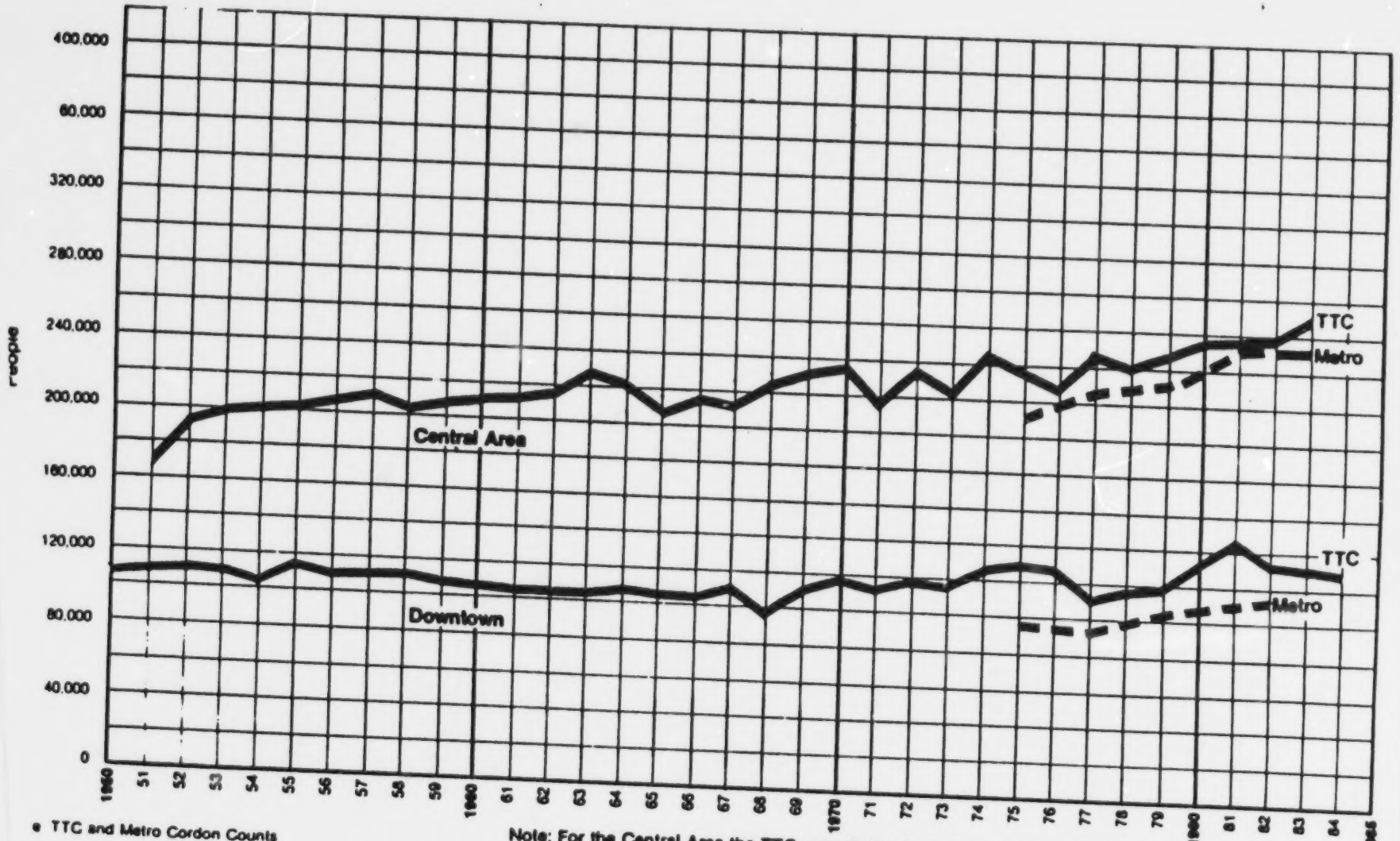
People Entering Central Area and Downtown: Comparison of Peak Hour and 2-Hour Peak Period



Source TTC Cordon Counts

FIGURE 5

Correlation of TTC and Metro Counts: People Entering in 2-Hour Peak Period



• TTC and Metro Cordon Counts

Note: For the Central Area the TTC uses their Intermediate Cordon while Metro uses their Railway Cordon. There are also slight differences in the two Downtown Cordons.

Thus, long-term data indicate stability of travel patterns and can serve a valuable role in verifying other methods of predicting travel trends. Predictions generated by any other method should be examined to make certain they bear some relation to these actual historical trends.

Trend lines can be extended into the future to provide projections of overall totals. The technique appears to be reasonably accurate and useful without having to guess all the underlying causes of transit use. However, it does not provide an insight into origin-destination patterns which are critical to determining the nature of transportation required. The biggest errors are introduced if the time spans from which projections are made are not sufficiently long or if the underlying factors have changed substantially. Only multidecade trends are trustworthy bases for estimating change.

In this instance there is no evident reason why rush-hour travel into the core should increase more rapidly over the next decade or two than it has over the last 30 years or why whatever increase there is should not be almost entirely on the GO trains, leaving other transit and roads much as they are at present.

Misconception: The present transportation system into downtown is thought to be reaching serious overloading and will soon be swamped.

Fact: While some facilities are used to near capacity, the travel on them has not changed appreciably for many years and there have been no adverse consequences. Because residential growth is occuring mainly outside of Metro Toronto, the only significant pressure for increased commuting facilities is on those required for long-distance trips, such as GO Transit. With the exception of GO, there has been little, if any, peak-hour increase of use of transportation facilities.

Perhaps the most direct way of examining the overloading issue is to look at the peak loading points in the transportation system. These include sections of the Gardiner Expressway and Don Valley Parkway, and the section of the Yonge subway line south of Bloor.

Figure 6 shows the historic volumes on the two roads. The Don Valley Parkway north of Bloor has been at capacity in places for the past 16 years and the Gardiner at Bathurst close to capacity for the last 7 years. They have more than adequate capacity closer to the central area. The stability of the expressway volumes is consistent with the data which shows little increase in total auto travel across the central area screenlines. With more travel related to regions beyond Metro, there may be some increasing pressure for use of the expressways which best serve these longer trips, as compared to local arteries.

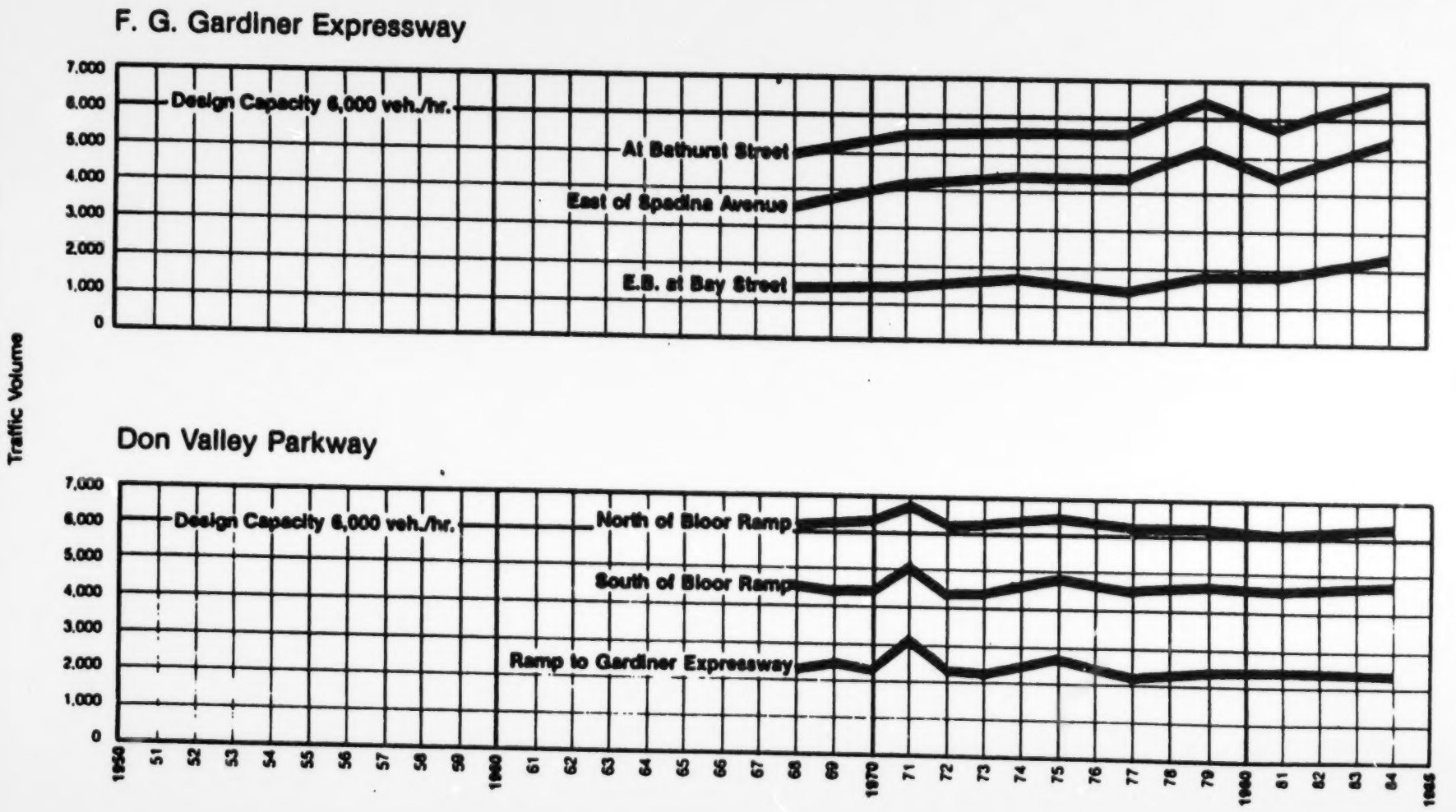
The traffic on the Gardiner Expressway that is by-passing downtown Toronto is shown in figure 6 by the "East Bound (E.B.) at Bay Street" line. Not only is it about a third of the total traffic on the Expressway, it also accounts for most of the growth that has taken place since 1968.

The Yonge subway line has a design capacity of 40,000 passengers per hour, but because of limitations is rated by the TTC at 38,000 passengers per hour due to loading and unloading problems. Figure 7 indicates that its current actual peak load is about 31,000 passengers per hour. Furthermore, the peak load on this section has been increasing over the last 20 years at quite a slow rate of around 100 daily rush-hour users per year, which is less than 1% per year. Continuing at this rate, the line has considerable capacity remaining before the 38,000 limit is reached. However, even this increase may not occur since the University line or GO transit are likely to take any increase in travel.

Even though below capacity, the current peak loading is probably higher than most riders want. As part of the joint Metro-TTC Downtown Rapid Transit study, riders were asked what they thought the loading limit should be. Most replied, no more than now. This answer is not surprising, but it should not be used to justify a Relief Line. Use of the full capacity of major facilities at a key link is not an unreasonable

FIGURE 6

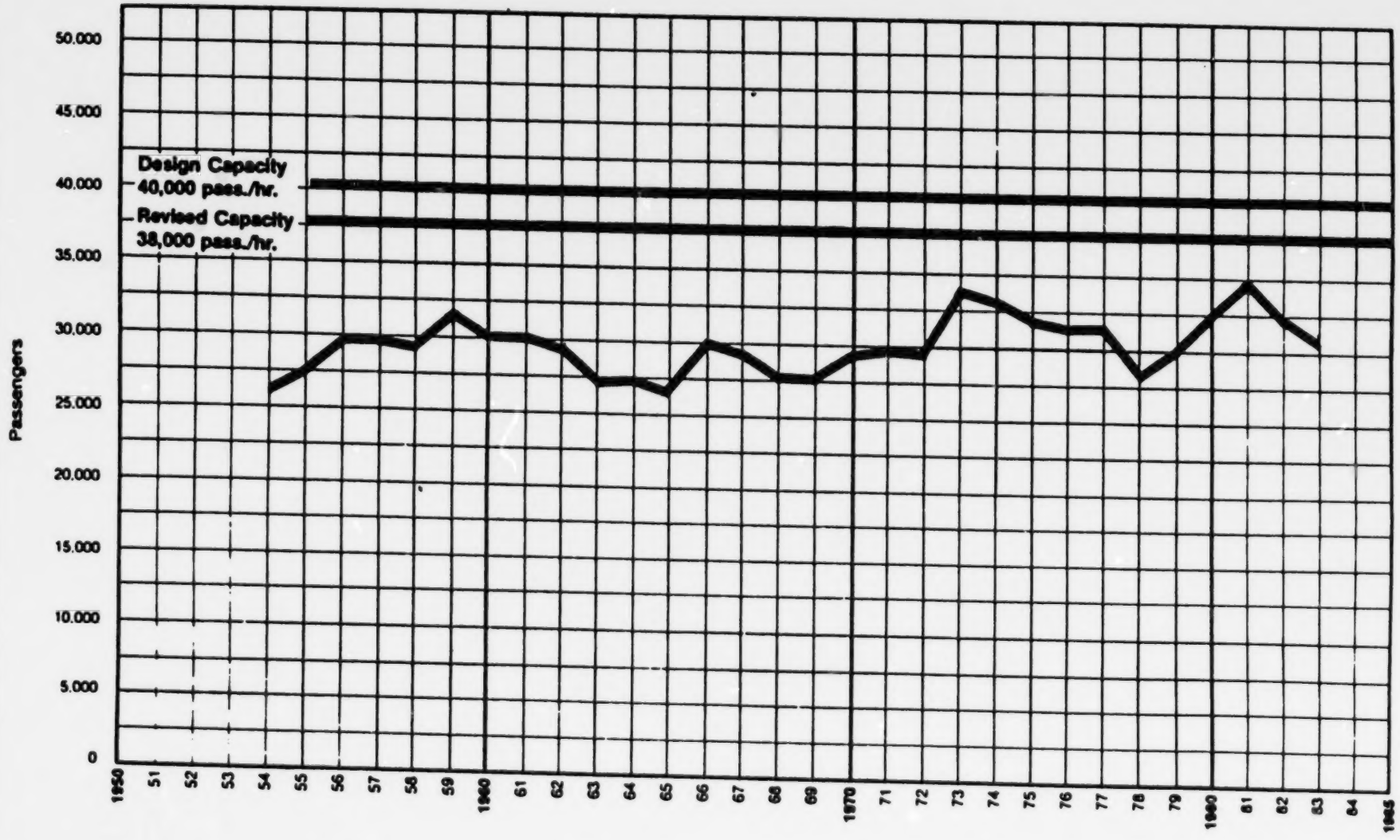
Morning Peak Hour Traffic on Expressways near Downtown.



Source Metro Traffic Counts

FIGURE 7

People Riding Yonge Subway South of Bloor in Morning Peak Hour



Source TTC Counts

peak-hour condition. Line volumes do drop each side of these key links.

If it is decided that peak-hour congestion should be reduced, there are other ways of relieving pressure which, while not cheap, are less expensive than a new line. The TTC could make changes to increase the frequency of trains. New motors and/or trains could improve acceleration. New signalling could reduce headways. Station improvements could help the flow of crowds at the Bloor-Yonge transfer point.

The situation at this transfer point is crowded at rush hour. However, the main question remains: is it essential to improve the situation, and, if so, can something be done to alleviate this pressure without going to the expense of a whole new line because of conditions on one short section of the Yonge line?

Another item that should be considered is the potential role of the GO trains. Practically all of the population growth in the Toronto region is taking place outside of Metro. The graph in figure 8 compares 1971 and 1981 residential origins for the people working in downtown Toronto. In 1981, 16% came from outside Metro as opposed to half that percentage 10 years earlier. The data indicate that the number of downtown workers living in Metro is stabilizing and may even decline, in the future, while the number coming from beyond Metro is increasing and will continue to do so.

The TTC solution to this new demand is to extend their services and pick up new riders from the region beyond Metro. However, it is not appropriate to offer frequent-stop type service from such a distance all the way to downtown Toronto. GO-Transit not only offers express service, but its capacity can be increased at more reasonable cost. Figures 2 and 3 demonstrate how GO is already handling nearly all of the peak-hour commuting growth over the past decade into the central core.

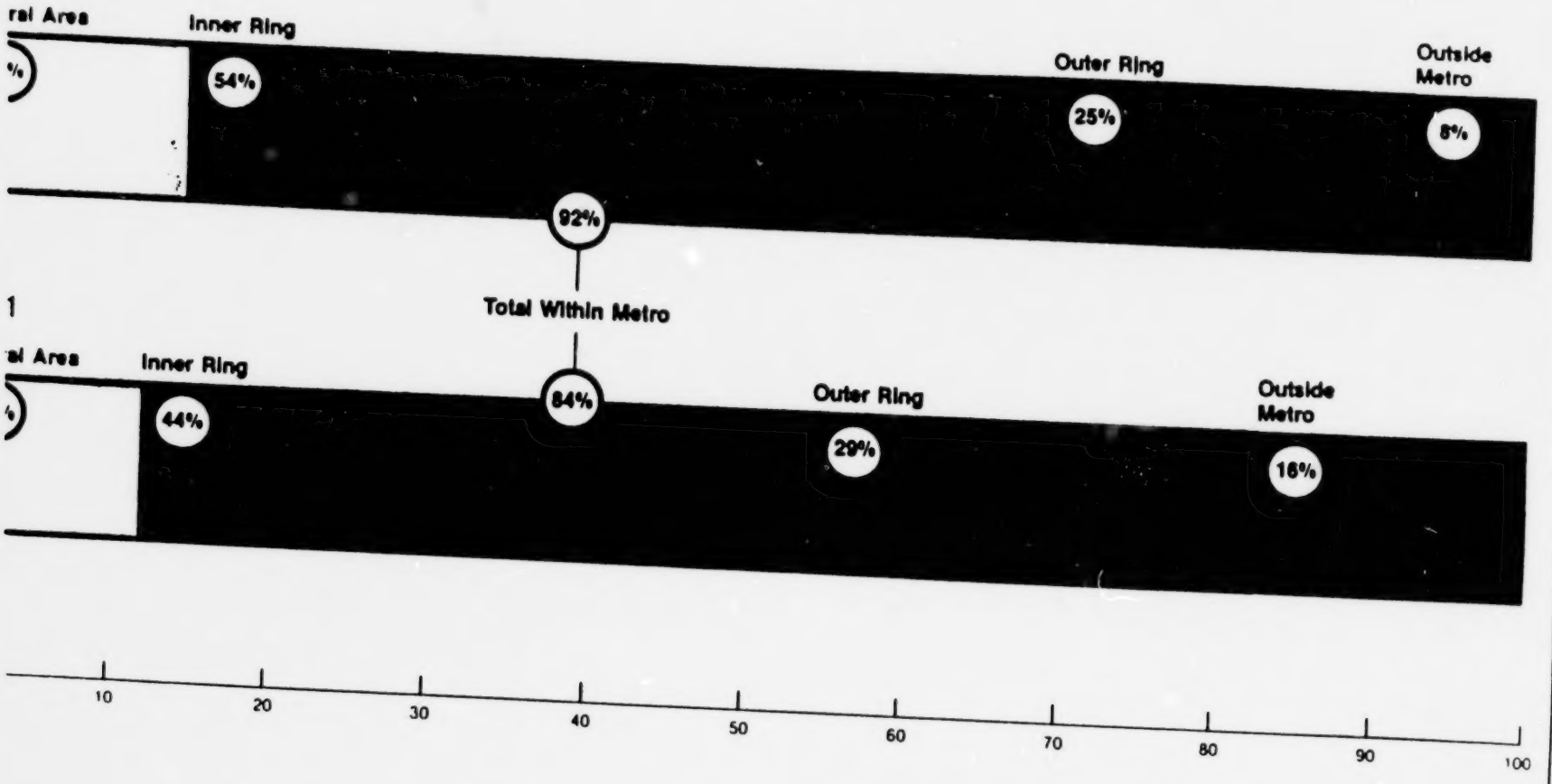
The main problem with the GO trains is that higher fares and lower frequencies are deterrents which keeps some people off GO and on TTC. Nonetheless, the cost of increasing frequencies on existing track and integrating its fare structure with that of the TTC is probably the most reasonable way of accomodating growth in commuter travel. This could also serve the people coming from outside Metro who are now being funnelled onto the ends of the Bloor and Yonge subway lines.

Not all solutions to the Yonge subway bottleneck have been exploited. Furthermore, more and more of the planned downtown development is moving to the west so the University line with its excess capacity has been the faster growing line south from Bloor. The GO trains will take up much of the demand from the suburbs and this could be increased even more by adopting fare structures which allow ready transfers with the TTC. Putting people into the subway at Union Station makes use of subway capacity in the direction opposite to main rush-hour flows.

JRE 8

nge in Where People Who Work in the Central Area Live

Outer Ring includes Scarborough, Etobicoke and North York north of Hwy. 401
Inner Ring includes Toronto, York, East York and North York South of Hwy. 401



1981 & 1971 Census Journey to Work Surveys

Misconception: The construction of new office buildings is thought to automatically mean a proportionate rise in the number of commuters.

Fact: The data reveal that office floor space in the central core in 1984 had increased to over $2\frac{1}{2}$ times what is had been in 1962 while peak-period travel increased only about 25%. There are several reasons, but one major factor is that each worker now occupies about $1\frac{1}{2}$ times as much space as he or she might have 20 years ago and the space per worker is still increasing. The essential fact is that rush-hour travel does not vary in proportion to office space.

The assumption that there is a direct correlation between the floor space in office buildings and the number of commuters has vast implications for the planning of transportation facilities.

The primary technique used for Central Area analysis is to add up the floor space of potential office developments which are allowed under zoning. An estimate is then made of the number of employees who would work in these buildings, and this is added to the current employment figure.

But this second step assumes that the offices will be built and occupied whether needed or not and that the ratio of floor space per worker does not change. If these assumptions are incorrect, then the number of future commuters is overestimated and excessive transportation facilities may be proposed.

The assumption of constant floor space per worker has major implications since it applies to all existing buildings as well as new ones. There is, in fact, a reduction of employment in existing buildings over time. Figure 9 indicates the trend over the last 25 years, based on the available data. Unfortunately, measurements over the years have not been consistent so the graph must be considered as a rough attempt to clarify the issue.

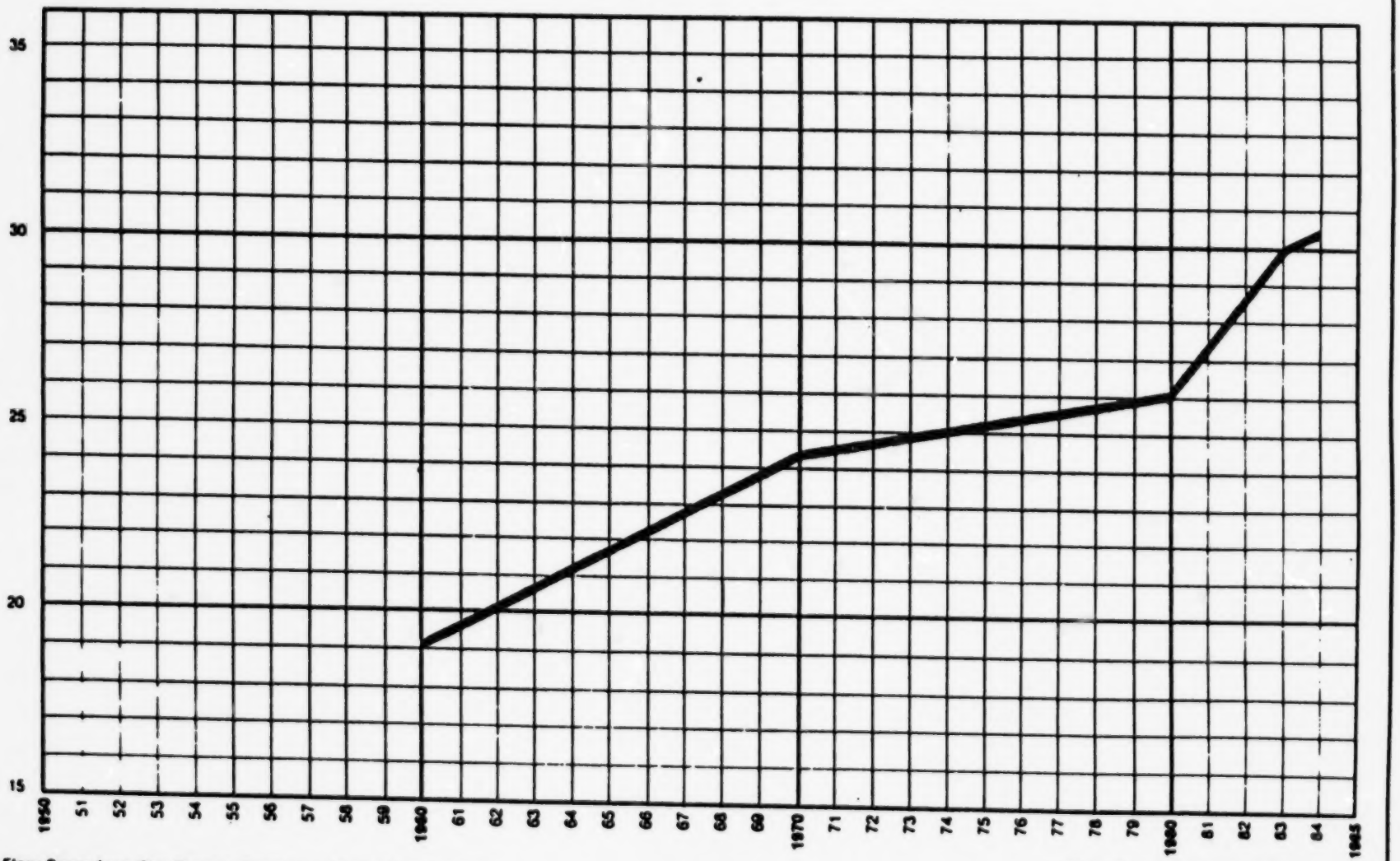
The 1960 and 1980 data points include only the net leased floor space, as surveyed by the Toronto planning department. Since this excludes unrented space, these points are slightly low. The other four points are from Metro's employment surveys and represent the ratio for gross floor area. There are also a few other inconsistencies in measurement; for example, whether public building spaces like elevators and lobbies were included or not. Also, the steep rise in the last three years probably reflects an oversupply of offices.

These initial data in figure 9 indicate that each worker occupies about $1\frac{1}{2}$ times as much space as he or she did 20 years ago.

For the purposes of planning transportation facilities, the key question is whether rush-hour travel is proportionate to office floor space. Clearly it is not. Figure 10 shows office floor space in the central core, as measured by the City since 1962. It also shows the trend in peak-period travel as recorded by

URE 9

erage Floor Space for Each Office Worker in the Central Core

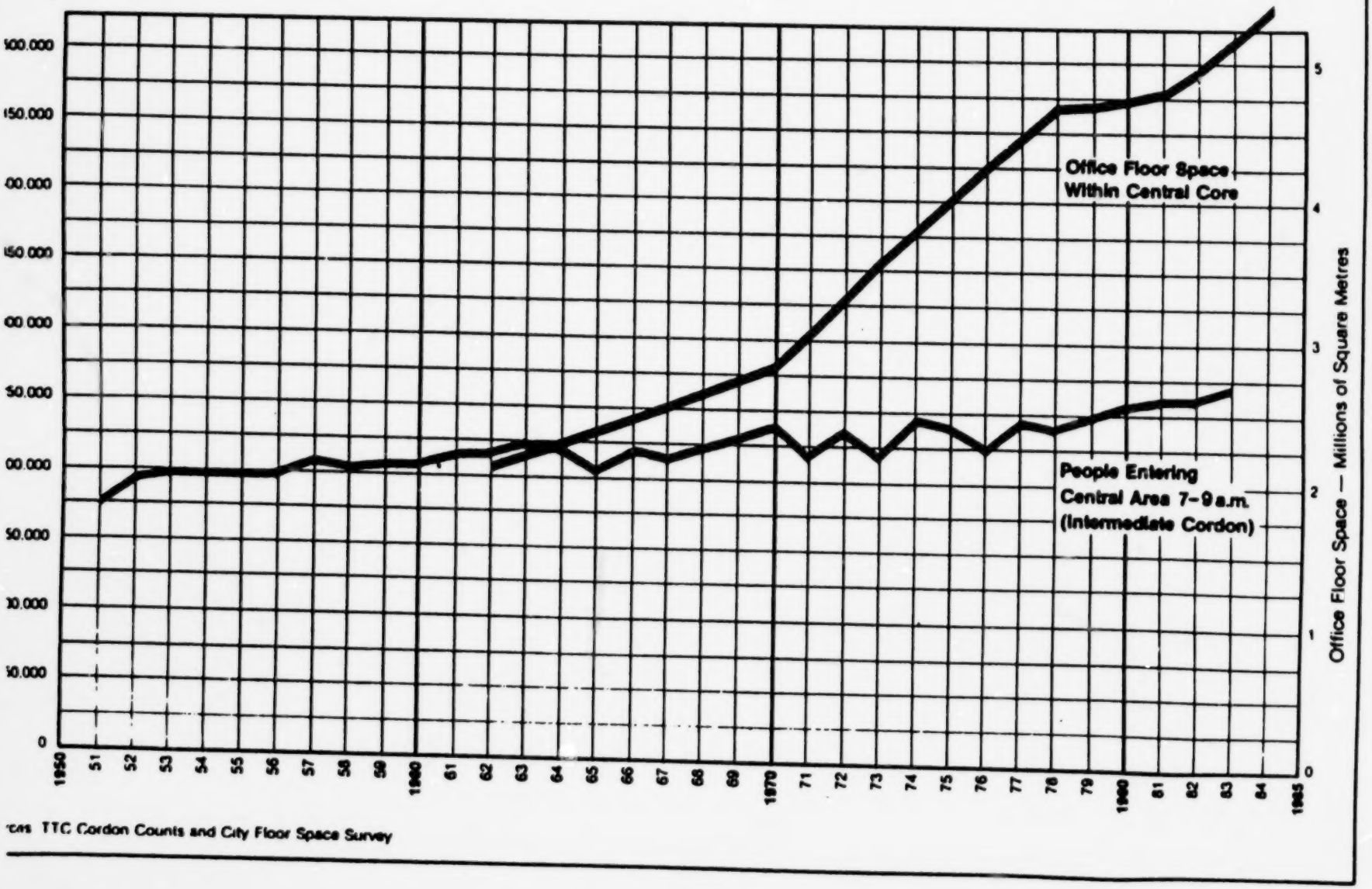


rces Floor Space from City Surveys Employment from Metro Surveys

Note: Prior to 1981 survey methods vary

URE 10

mparison of Office Floor Space and Morning Peak Period Travel



ces TTC Cordon Counts and City Floor Space Survey

the TTC. Putting the two together makes it very clear that they are proceeding at very different rates.

While office floor space in the central core has increased rapidly, reaching more than $2\frac{1}{2}$ times the 1962 figure by 1984, the peak-period travel increased slowly, rising only about 25% in the same period.

A comparison of figures 9 & 10 indicates that even allowing for the 50% growth in floor space per worker over 20 years, the actual increase in rush-hour travel is less than the indicated increase in office employment. It would appear that a diminishing proportion of workers travel at rush hour, and this trend seems likely to continue.

Other factors contributing to the reduced peak-hour ratios include more people living downtown near their work, lower attendance rates than in the past partly due to more people performing their work at home and more flexibility in working hours.

The meaning of trends to greater floor space per worker

With a similar trend to more office space per worker being observed in other cities, it might be useful to examine the reasons for this phenomenon.

In the 1950's, the older buildings had windows along the front and back. The upper managers occupied offices along the front; the supervisors along the back. In between sat the clerks pushing paper from desk to closely-aligned desk. This mass of clerks all had to arrive and leave together because, in effect, they functioned as a giant data processing machine. Together, the clerks were the computers of old.

The widespread introduction of the computer has meant that not only have many clerks been eliminated, but there is less of a need for all support staff to arrive at the same time.

Business has become more dependent upon the interpretation of data. This means that companies require more professionals, which in turn means the office space allotment per person had to rise. The changing way of doing business also requires more conference rooms in which people can meet to discuss findings and proposals. Competition for both the best professionals and for customers also meant that offices became more elaborate and attractive. Prestige and prosperity allow larger, decorated lobbies and reception areas.

All this raises rental costs, of course, so companies began to look for ways of cutting costs on the expensive downtown rentals. Companies that didn't need to be downtown moved to the suburbs. But some companies, which needed to be where the action was, did the next best thing. They moved support functions to the suburbs and kept executive functions in the core. This further raised the core floor space per worker ratio.

The effect of the increase in floor space per worker applies to all buildings, old and new. Over time, the number of workers in an office building and the rush-hour trips generated diminishes. New buildings add new commuters at the same time as old ones have fewer.

There is something more profound which is fundamentally wrong with the method of trying to predict the number of commuters from the potential downtown floor space. It is based in the underlying unstated assumption that floor space causes jobs, when in fact it's the growth of companies which causes the demand for buildings.

Projections of floor space sometimes include all the buildings that current zoning regulations would allow, but sometimes only planned buildings are counted. There is little consistency in how future floor space is determined. There is no measure of whether such projects will actually be built or over what period of time. Yet, commitments may be made to transit facilities to serve this uncertainty.

There is an underlying assumption that development will continue on its own without any regard to market forces. Better projections require planners to note the evolution or growth in the business community. It is better to make predictions from an understanding of the causes of the evolution of the economy rather than its effect — the buildings put up to accomodate economic growth.

In the last 20 years while office space more than doubled, peak-hour commuting levels have remained rather stable.

City and Metro planners have based employment predictions on floor space. But travel volumes have not risen nearly as much as that method would indicate. Currently used employment prediction methods need to be re-evaluated and the transportation plans which are based on them should be rethought.

Actual travel trends should be monitored and this should be used to check the effect of new development in the downtown core and whether there is likely to be a need for an augmentation of the transportation system.

Planning Areas and Traffic Cordons